REMARKS

By this Amendment, Applicants have canceled claims 7, 8, and 10-17 without prejudice or disclaimer, amended claims 1-5 to improve form and/or clarify the claims, and added new claims 18-22. Claims 1-6, 9, and 18-22 are pending.

In the last Office Action, the Examiner:

(a) rejected claims 8 and 11 under 35 U.S.C. § 112, ¶ 2 as indefinite;

(b) rejected claims 7, 10, 13, and 16 under 35 U.S.C. § 102(b) based on "Structure Analysis and Recognition of Mathematical Expressions," Proceedings of 3rd International Conference on Document Analysis and Recognition ("*Twaakyondo*");

(c) rejected claims 1, 2, 9, 12, and 15 under 35 U.S.C. § 103(a) based on "A Syntactic Approach to Processing Mathematical Expressions in Printed Documents," Proceedings of the 15th International Conference on Pattern Recognition ("*Garain*") and "Incorporating Syntactic Constraints in Recognizing Handwritten Sentences," Proceedings of the 13th International Conference on Artificial Intelligence ("*Srihari*");

(d) rejected claims 3-6 under 35 U.S.C. § 103(a) based on *Garain*, *Srihari*, and *Twaakyondo*; and

(e) rejected claims 8, 11, 14, and 17 under 35 U.S.C. § 103(a) based on *Twaakyondo* and *Srihari*.

REJECTIONS OF CLAIMS 7, 8, AND 10-17

Applicants have canceled claims 7, 8, and 10-17 without prejudice or disclaimer of the subject matter contained therein. Accordingly, the rejections of claims 7, 8, and 10-17 are moot. Applicants reserve the right to pursue the subject matter contained in the canceled claims at a later time, such as, for example, in a continuation application.

REJECTION UNDER 35 U.S.C. § 103(a)

Claims 1 and 2:

Applicants respectfully traverse the rejection of claims 1 and 2 under 35 U.S.C. § 103(a) based on *Garain* and *Srihari* because the cited references fail to teach or suggest, separately or in combination, each and every element in claim 1.

Specifically, for claim 1, neither *Garain* nor *Srihari,* separately or in combination, teaches or suggests at least "a first dictionary configured to store a pair of evaluation scores for each type of word that can be identified by means of normal expression, a first one of the pair of evaluation scores giving the probability of belonging to the text and a second one of the pair of evaluation scores giving the probability of belonging to the mathematical expression, . . . and a mathematical expression detecting unit configured to search for an optimal path connecting words by selecting one of the text and the mathematical expression based on a formative grammar and the first and second evaluation scores showing the possibility of belonging to the text and that of belonging to the mathematical expression for each of the words, the optimal path having the largest sum of evaluation scores given to a word, thereby detecting characters belonging to the mathematical expression," as recited in the claim (underline added).

Garain merely discloses an approach for understanding printed mathematical expressions by detecting the expressions in a document, recognizing the symbols in the expression, and arranging the recognized symbols. *Garain*, Abstract. The detection of the expression is done through recognition of a few most common symbols and exploitation of structural features of the expressions. *Id.*, Abstract; p. 523-524. The recognition of the symbols is done using feature-based and template-based techniques. *Id.*, Abstract; p. 524-525. The arrangement of the recognized symbols is done using a

scanning or lexical analysis, followed by a parsing or syntax analysis. *Id.*, Abstract; p. 525.

Srihari merely discloses methods of applying syntactic constraints to the output of handwritten word recognizers. *Srihari*, Abstract. The first method incorporates tag transition statistics. *Id.*, p. 3-4. The second method combines syntactic and statistical knowledge. *Id.*, p. 4-5.

Neither *Garain* nor *Srihari* teaches or suggests at least a pair of evaluation scores for each type of word. Neither do they teach or suggest that the first of the pair of evaluation scores gives the probability of a word belonging to text and the second score of the pair of evaluation scores gives the probability of the word belonging to a mathematical expression. Finally, they fail to teach or suggest searching for an optimal path connecting words by selecting one of the text and the mathematical expression according to formative grammar and the first and second evaluation scores, where the optimal path has the largest sum of evaluation scores given to a word.

Hence, for the above reasons, the rejection of claim 1 and its dependent claim 2 under 35 U.S.C. § 103(a) based on *Garain* and *Srihari* should be withdrawn.

Claims 3-6:

Applicants respectfully traverse the rejection of claims 3-6 under 35 U.S.C. § 103(a) based on *Garain*, *Srihari*, and *Twaakyondo*. Claims 3-6 ultimately depend upon claim 1 and includes all limitations in claim 1. As discussed above, *Garain* and *Srihari* fails to teach or suggest, separately or in combination, each and every element in claim 1. *Twaakyondo* fails to overcome these deficiences of *Garain* and *Srihari* for claim 1.

Specifically, *Twaakyondo* discloses recognizing mathematical expressions printed in documents by analyzing two-dimensional layout structures of symbols within the expressions. *Twaakyondo*, Abstract. *Twaakyondo* does this using a specific structure analysis to check local structures of subexpressions and a basic structure analysis to check a global structure of the whole expression. *Id.*, Abstract; p. 432, 434. This is not the same as and does not suggest, separately or in combination with *Garain* and *Srihari*, "a first dictionary configured to store a pair of evaluation scores for each type of word that can be identified by means of normal expression, a first one of the pair of evaluation scores giving the probability of belonging to the text and a second one of the pair of evaluation scores giving the probability of belonging to the mathematical expression, . . . and a mathematical expression detecting unit configured to search for an optimal path connecting words by selecting one of the text and the mathematical expression based on a formative grammar and the first and second evaluation scores showing the possibility of belonging to the text and that of belonging to the mathematical expression for each of the words, the optimal path having the largest sum of evaluation scores given to a word, thereby detecting characters belonging to the mathematical expression," as recited in claim 1 (underline added). Accordingly, because *Twaakyondo*, separately or in combination with *Garain* and *Srihari*, fail to teach or suggest each and every element of claim 1, the rejection of dependent claims 3-6 under 35 U.S.C. § 103(a) based on those cited references should be withdrawn.

Claim 9:

Applicants respectfully traverse the rejection of independent claim 9 under 35 U.S.C. § 103(a) based on *Garain* and *Srihari*. Although claim 9 contains different

limitations and has a different scope from claim 1, the rejection of claim 9 under 35 U.S.C. § 103(a) based on *Garain* and *Srihari* should be withdrawn for reasons similar to the ones discussed above for claim 1.

NEW CLAIMS 18-22

Applicants have added new claims 18-22. Claims 18-22 are allowable at least by virtue of their dependence upon allowable claim 9.

CONCLUSION

Applicants respectfully request reconsideration of this application and the timely allowance of the pending claims.

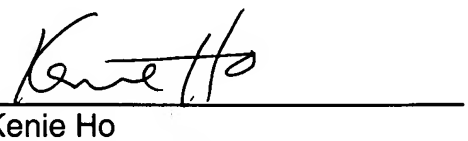
Further, Applicants note that the Office Action contains numerous statements reflecting apparent assertions concerning the related art and claims. Regardless of whether any such statement is addressed specifically herein, Applicants decline to automatically subscribe to any assertion and/or characterization set forth in the Office Action.

Please grant any extensions of time required to enter this response and charge any additional required fees to our deposit account 06-0916.

Respectfully submitted,

FINNEGAN, HENDERSON, FARABOW,
GARRETT & DUNNER, L.L.P.

Dated: December 30, 2005

By: 

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